INTERNATIONAL HEALTH EXHIBITION

Supplements to The Builder.

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DRESS, FROM A SANITARY POINT OF VIEW.

BY A MEDICAL MAN.

THE factors which directly or indirectly affect the public health are so infinite and so varied that it would perhaps be rash to pronounce foreign to the subject anything which is shown at the International Health Exhibition; yet, even with this proviso, we think the exhibitors have fully availed themselves of the freedom so afforded them. It seems to us quite possible that, were not the nature of the show, or its contracted form, "I.H.E.," placarded everywhere in large capitals, people with only average acuteness might wander through the galleries, try the dinners, taste the coffee, and listen to the music, without it occurring to them that the object of all this was to preserve a *mens sana in corpore sano*, and still more easily might they go away without having mastered one theory or absorbed one fact towards so desirable a consummation. It is to be regretted that the sanitary and the unsanitary are not more generally brought into sharper contrast, so that the public might have brought home to them a knowledge of what to avoid and what to strive after. If such pointed contrast were not necessary there would be no occasion for the show which is now going on at South Kensington. For instance, London is one huge exhibition ever before our eyes, showing innumerable examples both of the observance and violation of sanitary laws; yet few of the millions who frequent it are inclined to distinguish the one from the other, or draw for themselves a profitable lesson. Although there is much that might be improved in the method of instructing the general public, there is still much of great value to the diligent observer. Our object here is to touch on the subject of dress, and we think the department devoted to this subject is in advance of many of the others, in the lessons which it affords, and the manner in which they are brought before us. To begin at the feet, there is exhibited the skeleton of a natural foot showing the beauty of its longitudinal and transverse arches held together by elastic ligaments, and which, by expanding as the weight of the body is brought upon them, prevent concussion, and give lightness to the step. Here also, it should be observed, that the great toe points forwards, and is not at all inclined towards the median line of the foot. By the side of this there is shown the plaster cast of a natural foot which has been allowed to arrive at years of maturity without having been deformed by the art of a fashionable bootmaker. Each toe is allowed to have an individuality of its own; it stands distinct from its fellow, is fairly cylindrical in section, and does not resemble the fag end of a "compressed" cigarette. In striking contrast with this is shown the cast of a foot which has been the victim of fashion, and which is, we fear, only an exaggerated type of the majority of feet in the civilised world. The great toe is so much bent towards the median line of the foot that it is forced beneath the adjacent small toes; there is partial dislocation at the last joint, with evidence that it has been the seat of a painful bunion. Then is shown an ordinary pair of fashionable boots, such as might have produced the deformity above described. The sides are sloped away symmetrically to the median line, where the boot has the greatest length, while the slightest reference to the healthy cast will show that the greatest length of a boot which fits should be opposite the first and second toes. By the side of these is shown a pair of boots such as would suit the undeformed cast before described, and it will be observed that there is plenty of room at the toes, and that the inner sides of the boots are almost straight; in fact, the toe of a sanitary boot ought more nearly to resemble a right-angled than an equilateral triangle, but the apex of the triangle is not required. Mr. Hall exhibits a boot of the Elizabethan period, which well illustrates another monstrosity existing at the present day. Here the heel of the boot is not placed beneath the heel of the foot, but almost beneath the crown of the natural arch, so that the advantage of its elaborate mechanism is entirely lost. This folly is perpetrated with the view of making the foot appear shorter than is really the case. The heel above described is not only misplaced, but also extremely high, and the evil results are many. Thus the weight is, to a great extent, shifted from the heels to the toes, forcing them into the ends of the boots and intensifying the evils caused by their narrowness, greatly increasing the risks of sprained ankles, and putting much extra strain on the muscles of the legs to maintain the body in its unnatural position. Before leaving the boots we may mention that Mr. Larssen exhibits some thick horsehair socks, which, being porous, elastic, and non-conducting, ought to be useful in preventing blisters and in minimising the risk of catching cold from wet boots.

The "Indestructible Boot Company" exhibit an ingenious metal sole, with projections or teeth, which are forced through the leather sole from its deep surface. It is claimed for them that they cause the sole to be very durable, and they certainly give it a substantial appearance, as the teeth show on the surface like so many nails. Experience, however, must decide whether they have the result of making the sole too rigid. Proceeding from the boots to the socks we find that a company for carrying out the designs of Dr. Jaeger, of Stuttgart, show some digitated socks. It is doubtful whether the public generally will be brought to adopt socks of this construction; for they must be rather more troublesome to put on, and keep in repair, besides having the result of making necessary a slightly wider boot; but there is no doubt that they are a step in the right direction, for they will help to absorb moisture, prevent the accumulation of secretion between the toes, and promote cleanliness in every way. This company also shows various forms of woollen underclothing, which appear to be of excellent material. Wool is certainly the best practical material to wear next the body, as it is porous, absorbent, and non-conducting. Unscientific people generally imagine that clothes *make* them hot. Such, of course, is not the case; they merely prevent the rapid transference of heat from the body to the surrounding atmosphere. For this reason it is evident that a non-conductor like wool is a good substance to wear even when exposed to the direct rays of a fierce sun; for it tends to prevent the heat from reaching the body, and so injuriously affecting its temperature. A popular illustration of this is in the storage of ice; for we wrap ourselves in a blanket to keep us warm, and we wrap ice in a blanket to keep it cold.

Mr. Lewis, of Cheapside, also shows some woollen underclothing of very fine texture; he claims that it is unshrinkable and very durable. Amongst the things shown which we hope may attract the attention of ladies, are two plaster casts of the human liver. One is that of a healthy liver of normal size and shape, such as might have belonged to a Venus, and the other of a liver such as might belong to many a dyspeptic lady whom one meets every day. It is much reduced in size, distorted in shape, and is marked with a number of parallel grooves showing where the ribs have been forced into its substance by the pressure of a fashionable corset. It would be unreasonable to suppose that such a liver would properly perform its functions, the other organs would suffer correspondingly, and the owner probably spent a sickly life, perhaps was the mother of sickly children, heavily handicapped in the race of life; and all this that she might be able to say she had a waist so many fractions of an inch smaller than that of her friend Miss A.

Amongst modern hats we noticed a design by Messrs. Elwood & Sons, called an "evaporator." It is made of flannel, in shape like a truncated cone, with a sponge at the apex which is to be occasionally wetted with water. It is intended to be worn in the top of a ventilated hat, so that the vapour given off by the wet sponge may keep the inside of the hat at a low temperature. In the room especially devoted to ladies' dress, there are shown some sanitary stays, which are less rigid and injurious than those generally worn, also various forms of woollen underclothing, and amongst them "combination" garments which are supported from the shoulders, and so relieve the overburdened hips. The "Suspenders" for avoiding the use of garters are to be recommended. These latter articles have very injurious tendencies, especially when worn below the knee. They hinder the return of blood from the legs, frequently make the feet swell, and are powerful among the various causes of varicose veins.

Passing to the Quadrant devoted to historical dress, we may congratulate ourselves that the dresses of our ancestors, though more picturesque, were not generally ahead of our own in practical use. With the exception, however, of some in the time of Edward IV., and those having the toes chained to the legs, the boots are for dry weather more adapted for comfort than those of the present day, for they seem to have been fitted to the foot instead of the foot to the boot as is now done. In military dress, the modern improvements are very marked, especially during the last few years, and we believe it is intended that the army shall shortly have a uniform which is not best calculated to make them conspicuous to the enemy.

BELGIUM.

THE catalogue for this section (which occupies a large annexe between the Aquarium and Queen's Gate, having greater space allotted to it than that claimed by any other foreign country) is not yet issued, and consequently there are many points which are apt to be overlooked, but by the courtesy of those connected with the Belgian Commission we have been enabled to derive considerable information from the carefully-displayed exhibits, which are of unusual excellence and interest. As a contrast to our own neglected "school" division, we find that this is nearly all "school," and illustrated most thoroughly from first to last, and, taken in conjunction with the recent report on technical education, affords a good study, and leaves the impression that we have much to learn as regards the general question of education, whether technical or otherwise. We will, however, start with the subjects as they are arranged, and begin with the small selection of glazed drain-pipes shown by M. Joseph Gibon, of Brussels, who has a few earthenware pipes of a darker colour than usual, and the ordinary bends and syphons, although the intercepting and trapped syphons to which we are accustomed are apparently not known; the prices are also given, and a 10-centimètre pipe, which corresponds to our 4-in. pipe, is given at one franc per mètre (about 3 ft. 3 in.), which is certainly cheaper than we can produce them here.

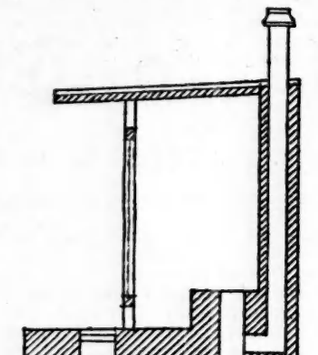
Some really excellent woodwork for internal finishing is shown by "La Construction Industrielle," walnut and oak in chimney-pieces and panelling of good design and workmanship, more especially the panelled door and over-door at the back of their space, which will well repay a close examination. Some of the same material worked in a different form is sent by M. François Rosel, 16, Rue Neuve, Brussels, whose cabinets and furniture of fumigated oak in imitation of the antique are very fine specimens of work. There is a Florentine tendency in the detail, and a careful avoidance of any harshness or crudeness which is so often noticed in old examples and which, in a material like oak, capable of close manipulation, is never called for.

M. Leon Boucneau sends some Belgian marble in the form of chimney-pieces, rather hard in outline and detail, but of good workmanship, and near these are some chimney-pieces of statuary and sienna by M. Evrard Leonce, 179, Chaussée d'Anvers, Brussels, which are delicate and fairly designed.

We now turn to a very different subject, of which we should much like to have seen more, viz., "housing the poor" in Belgium. "Des Habitations Ouvrières," by M. Dr. Lebon, is a pamphlet explaining the working of the "Bureau de Bienfaisance de Nivelles," whose efforts appear to have been on a small scale, but yet very successful. It is the principle of a building society applied to artisans' dwellings, by which means the thrifty artisan is often enabled to acquire his own tenement. There is an elevation given of a two-storied building containing twelve sets of rooms, and, although there is no plan attached, it can be gathered sufficiently near from the accompanying pamphlet, which is chained to the drawing. On the ground floor is a kitchen or "chambre de réunion," 15 mètres superficial, which, in English measurement, would be as nearly as possible 13 ft. by 12 ft. 3 in., a water-closet, and a lobby opening on to the staircase; on the top floor are two bedrooms with separate entrances. The cost of the twelve houses is given at 19,457 francs, or 1,621 francs each. These are let at an annual rent of 64 francs 86 centimes, and a monthly payment of four francs is exacted by the "Bureau" towards an accumulation fund to allow the occupier to become the proprietor, and the inhabitant in each of these instances already has thus saved 1,400 francs. In addition to the rent the "locataire" pays a ground-rent of 2 francs 25 centimes, 48 centimes for insurance, and 7½ francs for maintenance; and, as the Bureau is limited to a 4 per cent. profit, a fair working margin is left. These figures are also much lower than we are accustomed to, and the cheapness of material and labour, added to the small cost of the land, give a good start to schemes of this kind, and make it difficult to form a comparison with our big efforts. We shall probably make further reference to this system later on when we are in possession of further information, which we hope soon to obtain.

A large number of important buildings next claim our notice. These are "Les Écoles Normales," or schools supported by the State for the instruction of the Instructors, male and female; and we at once see the rapid advance made by the Belgians since 1878, when the question was taken in hand by the Government under M. Germain. The school at Bruges is thoroughly typical of sixteenth-century Belgian architecture, with the usual brick surface tracery, much the same as a great deal which already exists, and which has been used in many modern buildings in their principal towns; it is not by any means a vigorous design, and it seems impossible to infuse much vitality into this style, which is probably the result of economical building; and moreover, like all State-aided productions in this direction, it is the "safe" line that is followed. The Ville d'Anvers is a thoroughly French example, such as we see in the "Moniteur"; it is a good drawing to a very large scale, and the warming, ventilation, and drainage are carefully shown. In this, as in other instances, the sewage arrangements are somewhat unusual, and the water-closets, which are external, are treated as a separate feature, of which the following description and diagram will give a fair idea.

It will be seen that the sewage flows direct into a "fosse," or cesspit, which is ventilated into the open air by shafts or chimneys above the roof of the low building, which contains a long range of these closets, and through which we have taken the section; but whether this system is worth following is a moot question. The school at Tournai, of which the cost is given at 1,000,000 francs, is a nondescript design of a poor and commonplace character,



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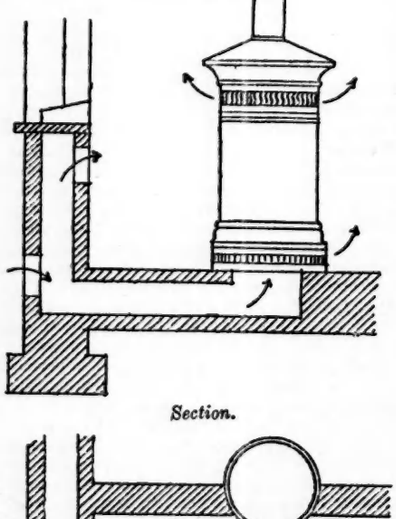
showing nothing special about the sanitary arrangements worthy of notice. The "École Normale" at Namur is a large building, shown by a French fine-line drawing, simple, though not wanting in dignity, and shows the academic training of the designer. A very bright, bold, and small drawing shows the Free School at Louvain, where the fosse system referred to is again to be seen. Another bright little drawing of the "École Gardienne" shows an ingenious arrangement for heating, viz., the hot-air stove is built into the wall which divides the class-room from the play-room, the hot air being given out on each side; one stove thus serving for two rooms, as will be further explained by the sketch.



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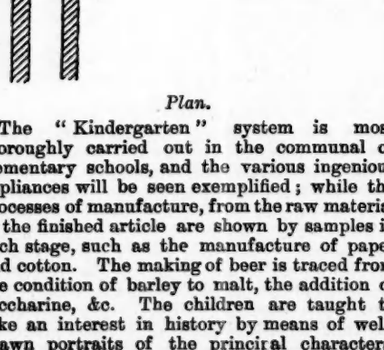

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The "Kindergarten" system is most thoroughly carried out in the communal or elementary schools, and the various ingenious appliances will be seen exemplified; while the processes of manufacture, from the raw material to the finished article are shown by samples in each stage, such as the manufacture of paper and cotton. The making of beer is traced from the condition of barley to malt, the addition of saccharine, &c. The children are taught to take an interest in history by means of well-drawn portraits of the principal characters, beginning with Ambiorix, whose time was principally occupied in fighting Julius Cæsar, when that worthy was not engaged in writing of or fighting against us. Philip van Artevelde, who brewed sedition as well as beer, and suffered accordingly, is also depicted in good drawing, and this is carried through generally in such a manner that the pupils cannot fail to look upon their work as full of interest. Geography is represented by good maps and taking pictures of the Roman Forum, Bay of Naples, New York, Constantinople, or Athens. Drawing, which they begin to learn at six years of age, painting, sculpture, architecture, archæology, mineralogy, music, and botany are equally well represented, although the buildings in which these pleasant subjects are taught are, to judge by the numerous photographs, of rather dreary aspect. Some school benches, desks, and ordinary fittings and appliances are also given, but as they do not vary much from those in vogue here, and, indeed, are scarcely so good or various as ours, it is unnecessary to do more than mention the fact. So much for the State or "Liberal" teaching in contradistinction to the Church or Conservative section, of which the leading spirit is the "Institut des Frères des Écoles Chrétiennes," which has its own institutions, and in which technical training seems principally directed towards ecclesiastical building and decoration of rather a poor and thin type, which same character applies to "St. Luke's School of Art," which appears to be their "South Kensington," where we find portfolios of drawings and designs of all kinds and in all materials, some of which are fairly good, but generally are of the "cast-iron Gothic" order, and against which we certainly can more than hold our own. The "Académies des Beaux Arts," as might be expected, are strong in studies from the antique, drawings, casts, and busts. The Carlsbourg Normal School, being mechanically-minded, sends some well-executed drawings of machinery and construction, as does also the "École Industrielle" a Gand which shows a piece of hand-woven tapestry and specimens of lace. The five orders and relative details, in well-drawn perspective, also appear in another section, of which the school at Malonne is an exponent. It will be noticed that nearly all these drawings are in pencil and colour, very little ink being used, as this latter method is often unsatisfactory, and leads to considerable hardness, besides occupying unnecessary time. The "City of Antwerp" naturally takes great pride in architecture, and illustrates it in many ways, and when the catalogue of this division is complete it will greatly add to the interest of a good representative exhibition.

SANITARY FITTINGS.

Resuming our notice of the exhibits in the Eastern Annexe, we may note that Messrs. J. G. Stidder & Co., of Southwark (Stand 534), have a very varied and complete display. Their improved valve closet, with patent overflow trap and ventilating junction combined, has much to recommend it. It is an improvement on Underhay's valve closet. The "Ultimatum" trapless closet and Stidder's treble-flush "Torrent" closet, are also worth the attention of visitors; the first named is made to work with an open soil-pipe, the mouth of which must be carried above the roof-top. The patent trapped "Universal" valve closet is another speciality at this stand. A tip-up lavatory of exceptionally strong make, suitable for use in schools, is worth notice; also Stidder's patent tip-up lavatory, in which the water enters the basin through the pivots or trunnions, hot water on one side and cold water on the other. A concealed wall urinal, the act of opening which turns on the water, exhibits marked improvements on earlier attempts at this form of contrivance. A good display of plumbers' brass work is made by this firm. Nor must we omit to mention their cast-lead pipe tacks for securing soil and other pipes to walls. These tacks may be made of an ornamental character to any design, and when soldered at intervals to the lengths of pipe afford a ready means of fixing. A wash-up sink, or trough, made either in galvanised iron or pine, is a very handy contrivance, serving a multitude of purposes, whether placed in a butler's pantry or a cottager's kitchen.

Moule's Patent Earth Closet Company (Limited) show, at Stand 535, their earth-closets and commodes, which are too well known to need more than the mention of the fact that

they are here. They do not provide for the disposal of house-slops, but for this purpose may be supplemented by one of Field's self-acting flush-tanks placed below the garden level for the reception of the slops, which are discharged from the tank by syphon action, and their contents conducted into the earth by means of agricultural drain-pipes. Properly carried out, this system of earth-closet and slop-tank afford, in small country places, an efficient substitute for drains and sewers.

At Stand 536 Messrs. Sharp & Co., of Holborn Circus, are exhibitors of the "Banner" patent water-closet and of ships' and earth closets, which appear to be serviceable and good. Ventilators and means of ventilation should, of course, play an important part in every sanitarily well-ordered building, and they are represented at this stand by Thomas Boyle's ventilators. But we purpose speaking of ventilating appliances in a separate article.

Stand 537 is occupied by the Austin Antiseptic Company, whose speciality is a small porous vessel which, charged with Condy's fluid or other disinfectant, is suspended or otherwise fixed in the water-waste preventer or flush-tank, so that the water using for flushing purposes becomes impregnated with the antiseptic material. This is, as it appears to us, a very good way of effecting the end which was aimed at by an apparatus already noticed, and in certain situations may be used with advantage, although, as we have before pointed out, sanitary fittings should not be dependent upon such aids for keeping them sweet.

Stand 538 is occupied by the Bower-Barff Rustless Iron Company, who show iron castings for sanitary purposes, treated by their processes. There is a wide field for the employment of this process, which, although largely used, is not yet generally known. We learn that furnaces capable of treating about 15 tons of mixed castings per week have been erected near Bankside, Southwark, and are now in daily operation. There is, unfortunately, a limit to the size of the articles capable of being treated by this process. No piece must exceed 12 ft. in length or 3 ft. in depth and breadth.

On the large and well-displayed stand (539) occupied by the well-known firm of John Bolding & Sons, are to be seen several specialities. The first thing we noticed was a very cheap and apparently strong and serviceable bath, made of stout zinc, japanned inside, and painted externally. It is mounted on feet, so that no casing or boxing-in is required. Some good tip-up and other lavatories displayed on this stand will bear inspection. Special attention may be directed to a lavatory, water-closet, and bath, fitted *en suite*. This firm are also exhibitors of some very good water-closets, both of the valve and wash-out type. Amongst them we may name Bolding's "Simplex" valve closet, in which the pipe supplying the overflow trap (at each flush) when empty serves as an air-pipe, and prevents the overflow trap being syphoned out. This closet is provided also with a ventilating pipe for ventilating the valve-box. A new valve-closet is shown, fitted with Truss's patent water-waste preventing valve, which is ingenious, though simple in action, and gives a good flush and after-flush. Visitors interested in such appliances should not fail to see this. Bolding's "Grosvenor" or "disconnected overflow" valve-closet has some very good points, having been specially designed to prevent the escape of sewer-gas into the house. The overflow is carried by a separate rim to the back of the closet, from which it is completely disconnected, and may be made to discharge in the same way as the ordinary cistern warning-pipe or overflow, or a pipe may be carried down to discharge over a gully or in any other convenient position. The "Alliance" wash-out closet, with front outlet, shown at this stand, is very efficient. A housemaid's slop-sink is shown, so fitted as to be portable,—a "tenant's fixture," in fact, like the bath already mentioned. In the Water Companies' pavilion, Messrs' Bolding & Son have a special display, to which we propose calling attention hereafter.

At Stand 540, Messrs. Capper, Son, & Co., of Ingram-court, Fenchurch-street, show their well-known twin-basin water-closets, and their very handy fold-up lavatories. Of the merits of these we have spoken on previous occasions. Some good tip-up lavatories, with pivot water-supplies,—hot one side, cold the other,—are to be seen at this stand. A speciality at this stand is the "patent pivot high-pressure water filter," which is so small and portable as to be easily soldered on to the nozzle of an ordinary house-tap. It pivots back when the water drawn from the tap is not required to be filtered. The filter consists in brief of a reversible cylinder filled with animal charcoal and asbestos. The process of reversing the cylinder causes the filter to be self-cleansing, and the cylinder can easily be refilled when necessary. It is claimed for it that it will continue in work for years without this being necessary. The water is not kept standing in the filter.

Messrs. Beck & Co. (Limited), of Southwark (Stand 541), have a very excellent display. One of the principal exhibits at this stand is Bell & Wheatley's patent syphon cistern for flushing closets, urinals, and for other sanitary purposes. This is strong and simple, has no valve (except the ball-valve), and is suitable for high or low pressures. The syphon discharge is set in motion by the depression of a loosely-fitting piston or plunger working in a cylinder. This cistern is one of the best of its kind. Beck's patent side outlet valve closet, with galvanised iron trap above the floor, is shown in combination with Bell & Wheatley's water-waste preventing apparatus. Beck & Co.'s flushing-rim closet basin and trap, and their elastic valve closet, are shown in action. Some good brasswork is shown at this stand, including valves, hydrants, gun-metal cocks and valves, and water fittings generally. Bell's patent double valve stopcocks, for connecting house services with mains for constant supply, meet the requirement very satisfactorily.

Some other exhibits in this annexe, as well as others of a kindred character scattered about in other parts of the Exhibition, we must notice in a further article, but before breaking off this week we will deal with the stand of another well-known exhibitor.

Mr. Henry Conolly, of Hampstead-road, occupies a very prominent and attractive stand (No. 375), in the Central Gallery. The fitting up of the stand itself is worth notice in passing, the Pompeian decorations of the specimen bath-room, which forms part o the exhibit, having been done by Messrs. W. Phillips & Son, of Baker-street. The ceiling is ventilated by means of a perforated cornice, the apertures in which lead to a rarefier, so as to facilitate the carrying off of the steam and vapour of the apartment. The bath is of what Mr. Conolly calls the "Acme" type, and in fitting-up and arrangement it certainly leaves nothing to be desired. The cabinet-work of this bath, and of the lavatory and toilet-table shown *en suite*, is of American walnutwood, with amboyna wood mouldings, and Tuhya-wood panels. The "cork parquetry" with which the floor is covered is a material admirably adapted to its purpose. The lavatory is provided with a very complete shampooing apparatus. A combined fold-up lavatory and urinal shown on the stand is likely to be found very handy where space is limited and where sightliness is essential. In an adjoining compartment Mr. Conolly has a variety of his specialities in water-closets and urinals. His "Nestor" valve-closet, with self-trapping overflow, embodies an improvement of value. Conolly's "Automatic" water-waste preventer, for flushing closets, urinals, &c., is, as we have said on previous occasions, a very good one. Some earthenware oval and circular lavatory basins, for corner and other positions, are worth notice. Demarest's patent wash-out closet (an American invention, we believe), is shown in action. Among other specialities at this stand are some good cast-lead rain-water heads, which, with a specimen of cast and sheet lead, merit the attention of visitors.

SANITARY HOUSE CONSTRUCTION, DAMP-PROOF AND FIRE-PROOF BUILDING MATERIALS, &c.

CLASS XXVIII., Group 3, or the Dwelling-house, is intended to show the materials of sanitary house construction, relating to roofs, walls, damp-proof solid floors, damp-proof wall coverings, cements, &c.; and further, this class includes a number of exhibits bearing upon fire-proof buildings. There are, however, a number of objects in the class under notice which, though appertaining to house construction, and in one sense sanitary and even artistic, properly belong to other classes in the same group. Some of these we have referred to in a previous notice. It is difficult, we know, in some cases to discriminate or separate one kind of object from another of kindred nature to it, but it is to be regretted that a large number of objects should be allowed so often to overlap each other, and otherwise to become dispersed in other classes, at a distance. Concentration, save to a limited extent, has not been a leading feature in the present Health Exhibition, and hence a considerable amount of trouble is experienced by the professional or practical man who desires to examine, as well as see, a distinct class of appliances or materials in connexion with improved house construction. A new invention, material, or mode of construction, stated to possess advantages over one previously in use, of course interests the architect, engineer, builder, and intelligent workman, not to speak of others concerned more or less in house building and repairing. Thus the concentration of a certain class of exhibits is highly desirable. We will, however, now proceed to give some particulars of the newest and the more important of the exhibits of Class XXVIII.

Messrs. Chambers, Monnery, & Co., of Bishopsgate-street (Stand 797), show among a number of other articles a section of hollow brick wall *in situ* to illustrate their patent cast and wrought iron wall-ties built in position. Two courses of bricks with a hollow space between equal to the thickness of a brick, are connected with a series of iron ties at intervals. The tie at either end is in the form of a dovetail, and these dovetail ends built into the course of brickwork strengthen the construction. The central portion of the wall-tie, of course, stands in the hollow space between both courses of brick, but being of thicker make than the dovetail ends, and being also shouldered on each side, it acts as a good stay. The walls can overhang neither outwardly nor inwardly, and in addition a dry wall is secured. Different forms of wall-ties are shown. The kitchen sink adapted for artisans' dwellings, and the kitchen range as used in improved workmen's dwellings, will fairly meet the required wants. The Midland Rustless Iron Company, Wolverhampton (Stand 798), furnish some goods of a noticeable kind. These include enamelled and decorative plates for fireplaces and overmantels, together with tile hearths, displaying decorative painted panels. A number of castings illustrate parts of filters, cisterns, meters, lavatory apparatus treated with what is termed "unfoulable enamel." Next we have hygienic enamelled wrought and cast iron baths, pans, &c. The exhibits, as a whole, are well turned out.

The Crystal Porcelain Pottery Company, St. Bride-street, E.C. (Stand 799) had no objects on view on the occasion of our visit. Three weeks have been allowed to pass, and yet not one object of any colour or form was on view at the beginning of the present week. Mr. R. Helbronner, Oxford-street (Stand 800), has on view some exhibits professing to hermetically exclude draughts by the expedient of a flexible cotton tube and grooved beading. These draught-excluders are intended for French or casement windows, bottoms of doors, &c. The cotton tube or riband is inserted in some instances into the stops of doors or windows; and, in other instances, the draught-excluder is fastened on the flat surface instead of into a groove. Under some conditions they will answer fairly well, but in other cases they will not have the utility of elastic or india-rubber beading. As to the word "hermetical" in relation to excluding air it is a folly to suppose that people could live in houses with the air absolutely excluded from passing through or around the sides of doors or windows into the room. It is proper to exclude draughts, but not pure air, but some nervous folk carry their craze so far that they cork up the key-holes of their doors and would lead one to suppose that ventilation and draughts were identical terms.

B. Cannon & Co., Lincoln (Stand 801), exhibit specimens of two very useful materials,—concentrated size, and glue powder, for painters, decorators, carvers, gilders, and other trades. The former only requires a few moments to prepare it for use, and already its value appears to be appreciated by its large consumption throughout the country by builders, painters, decorators, paper-hangers, and others. Mr. John Matthews, Royal Pottery, Weston-super-Mare (Stand 802), as usual displays a good assortment of his well-known pottery, patent bonding roll, square and curved roofing tiles, terra-cotta objects, special ridging

bases, finials, &c. We have, on sundry occasions, spoken favourably of this ware. Messrs. Diespeker & Co., Holborn, E.C. (Stand 803), show specimens of Roman and Venetian marble mosaic objects for floors, doors, dados, and wall coverings, which have already been incidentally alluded to in a former notice from a decorative point of view. From a sanitary and constructive aspect we may add that the mosaic is non-absorbent and damp-resisting, and will last for very many years indeed if not subjected to exceptionally rough usage. Messrs. Charles Drake & Co., Battersea Park, S.W. (Stand 804), display, in addition to mosaic facing bricks and fire-resisting fibrous-plaster slabs, some fire-proof concrete floors, stairs, doors, concrete moulding, together with a concrete building apparatus. On a former occasion at more than one building exhibition we have described Messrs. Drake's exhibits in detail. Of fire-proof construction in relation to some exhibits in the class under notice, we may say something further on. Mr. Joseph J. Ellis, of the Ellistown Brick, Tile, and Fire-Clay Works, near Leicester (Stand 805), exhibits red-clay and fire-clay ware, cut, hand-pressed, facing, ornamental, and variety of other goods, including crucible and cement clays. The articles, as far as we had time to examine them, are of very good manufacture. Mr. Foot, of Wellington, Somerset (Stand 806), presents some novelties in bricks, a speciality being those for damp-proof walls. The bricks in some cases, according to the work for which they are required, are made to dovetail into each other. In some bricks, the pins and the tails are moulded on the bricks, and in other cases tails or openings are in both bricks, allowing for a cast or wrought-iron dovetail or pin to be dropped between even with both bricks. The tiles intended for paving purposes are similarly prepared for joining, but in respect to the bricks there is an allowance for an open space between. The damp-proof bricks will, to some extent, fulfil the intention that suggested their manufacture. Messrs. James Stiff & Son, Lambeth (Stand 807), exhibit in this class and elsewhere in the building an assortment of fire-proof terra-cotta ware, ventilating bricks, damp-proof courses, and terra-cotta articles for architectural ornamentation, unexceptionably good of their kind. It is not necessary to enlarge on the merits of the goods of this old-established firm.

Perhaps it will not be amiss at this point to say a few words about the class of damp-proof and fireproof exhibits, some of which have been already noticed. We find in Class XXVIII. a number of composite materials intended for damp-proof and fireproof construction, but although some of them are very serviceable, it would be wrong on our part to say that they fully meet all the requirements sought in their application. A few of these damp-proof methods and processes have been for some years before the public, while others have been only recently introduced. In some cases a fair measure of success has attended their application, and in other instances a very partial one; yet time, in respect to the latter, may show better results. Then in regard to fire-proof construction or building, the word "fireproof" is only a relative term, and it must not be understood to mean that the material or the building to which we apply it cannot be damaged or destroyed by fire. The result of all inventions and materials hitherto employed, certainly tends in the direction of greater safety, yet the sum total amounts to only diminished liability to damage by consuming fire. Some materials and substances are more readily destroyed than others, and the object of improvements in fireproof building should be to render materials at present easy of ignition, or of succumbing to fire, difficult to be set on fire. Not only has the saving of property to be considered, but the saving of life in fireproof construction. It is well known that the effect of strong jets of water on cast-iron and stone is to cause them to split and fly like glass, and it will also strip walls and ceilings of plaster with wondrous rapidity. Then comes the washing-out of the joints of the brickwork by some chemical action in the lime mortar, or, perhaps, by the mechanical effects of a sudden cooling. A sudden or unequal cooling will lead to the distortion of malleable iron. The effect of water on burning timber would be simply the stopping or delaying of the process of combustion if the water were efficiently applied. Of course, also, water may cause special damage to goods. The stones in buildings more liable to destruction than others are limestones, or those made up of a combination of lime and other agents. But, indeed, the great majority of building stones are affected by strong heat. The class of building materials the most trustworthy (indeed, some of them thoroughly so) are earths and cements, supposing we use the term to comprise all mortars and concretes the materials of which do not include uncalcined limestone. In view of what we have stated, sundry of the fireproof building exhibits in Class XXVIII. should have their real value judged and estimated.

Hitchin's Fireproof Plastering Company, Gresham-street, E.C. (Stand 808), present specimens of half-timbered buildings, illustrating the advantages of Hitchin's "patent improvements in plastering." It is stated to be fire-resisting, and good for staying the transmission of sound. It is also put forward as a speciality for damp walls, and for casings for the protection of girders and columns from fire. The groundwork in this system of plastering is a wire netting, instead of laths. A number of plaster slabs or casings are also on view, and some *in situ*, showing the application to wall linings. A sanitary dwelling, erected not far off in the Exhibition building, shows the application of this sytem of plastering, and the work has a good appearance. Of its sound-staying properties we are unable to speak at present. Mr. Archibald Dawnay, King William-street, E.C. (Stand 809), displays samples of solid floors, concrete-encased ironwork, and rolled joists and girders used in the construction of solid floors. Here we have on view samples of rough concrete in lump, iron girders and columns encased with concrete, rolled-iron joists, angle and tee irons, and other forms of ties and supports used in connexion with concrete and fire-proof construction. The ironwork exhibits are of excellent manufacture, and the illustrations in concrete and iron are of a fairly satisfactory kind, considering all the belongings of fireproof construction and its present standard of execution.

Mr. Malcolm Macleod, Deansgate, Manchester, and Mile-end, London, E. (Stand 811), shows samples of his "metallic antiseptic" concrete, stated to be proof against fire, damp, vermin, &c. There are also on view samples of natural and artificial asphaltes, for roofs, floors, pavements, and other purposes. An assortment of similar materials is shown by the Val de Travers Asphalte Paving Company, Old Broad-street, E.C. (Stand 812). These exhibits include samples of refined bitumen used in the manufacture of asphalte materials; and there are models displayed showing the application of asphaltes to various uses in street pavements, roofs, foundations, damp-courses, &c. Mr. George Evans, Adelaide-street, Charing-cross (Stand 814), presents a solid wooden staircase, full size, with heads and risers covered, and a plastered soffit, also solid wooden floors, showing a method of forming ventilation. We cannot endorse the statement made on behalf of these exhibits that they are fire-proof and sound-proof, except to a limited extent. The work in itself, however, is creditable. Wilkes's Metallic Flooring and Eureka Concrete Company, Devonshire-square, Bishopsgate, E. (Stand 815). These exhibits have on a former occasion been spoken of very favourably by us on the score of strength and finish. Among the present objects are fireproof floors, stable and basement floors, dressings for buildings and sewers in section. The manufacture is good. Mr. Thomas Wharam (Agents, Burke & Co.), Newman-street, W. (Stand 817), submits specimens of his patent wood-block flooring. The blocks are laid diagonally on a basis of concrete. Some of the blocks are of oak, and other specimens are a combination of oak and mahogany. This block flooring is a kind of parquetry work. It is apparently strong in construction, and we believe it would prove durable if always efficiently done. In this class Mr. Thos. Jennings, of Lambeth, S.E. (Stand 817), exhibits patterns of flooring specially prepared for hospitals and sanatoriums. The specimens are what is known as paraffined floors. The method of fixing the boards shows no nail-holes, but there is a tonguing. The paraffin dressing is stated to render the floors non-absorbent. Time alone can prove the utility of this method of flooring, which appears to be recommended by the medical faculty. Cognate to the last-named exhibits Mr. Charles Langstaff, M.D. (Stand 819), shows a model of a floor prepared with paraffin, a treatment which, it is said, he was the first to suggest. Hard paraffin is a white, solid, volatile substance not unlike white wax. To prepare it for application it is melted in an iron pot or earthenware vessel, and whilst hot is painted over a portion of the wood, then ironed into it with a box iron. The paraffin is thus driven into the wood, and a paraffin surface procured. The floor is prepared bit by bit at a time till the whole is completed. A floor surface results somewhat like a waxed parquetry floor. We fear that a moist cloth and a hard brush twice a week would fail to remove all the dirt that may accumulate where there is a good traffic over the floor. In the model of this floor the boards are laid diagonally, and their edges are bevelled to allow them to overlap. The nails are driven through the overlapping portion of each board. Even if the flooring boards were of hard wood, we do not approve of the bevelling of their edges, for reasons obvious to every practical man. Tongued and grooved boarding is the best, or a grooving run in the edge of each board, and a tongue of wood or thin iron inserted. Well-seasoned timber is indispensable, and, if time permitted, the permanent nailing down of the floor ought to be delayed for several months. On the same stand there is a model of hot-air disinfecting chamber, with bath and lavatory attached, intended for disinfecting the clothes and person of a nurse after nursing an infectious case; also a model of a ventilating apparatus for filtering air and charging it with chemical compounds. Messrs. Towers & Williamson, Adamantine Clinker Works, Little Bytham, Stamford (Stand 821), display their "Adamantine Clinkers" for "a solid sanitary floor." Whether these clinkers for paving "will wear longer than any other, vegetate least, absorb least moisture, and are therefore dryer than any other paving in the market," we are not at present prepared to say. From an examination, however, of these narrow paving bricks, we can say they possess extreme hardness, and they certainly have some qualities that ought to ensure them a favourable reception for use in stables, coach-houses, yards, abattoirs, markets, and other places.

Some other exhibits in this class must await a further notice.

We report on p. 819 of this week's *Builder* the first of the Conferences held in connexion with the Exhibition, and in our list of "Meetings" on p. 842 will be found particulars of next week's Conferences.

HEALTH EXHIBITION.

Group III. Class XXII. South Annexe.
BATTEN'S PATENT
SEWER VENTILATORS
AND MAN-HOLE COVERS.
No. 150, LOZELLS-ROAD, BIRMINGHAM.
[See May 31, p. xxii.

BECK & CO. (LIMITED),
130, GREAT SUFFOLK-STREET, SOUTHWARK, S.E.
STAND 541. EASTERN ANNEXE.
VALVES, HYDRANTS, METERS, STREET BOXES, ROAD WATERING POSTS, PUMPS for Hand and Power.
Patent Water-Waste Preventing Cisterns and Water-Closets.
Fire Extinguishing Appliances, &c.

Group III. Class XXV. No. 715, Central Annexe.
VENTILATORS for ROOFS of HALLS, CHURCHES, SCHOOLS, HOUSES, DRAINS, SEWERS, &c.
W. P. BUCHAN, S.E. { 21, Renfrew-street, Glasgow.

SEMI-VITREOUS WHITE and BUFF FACING BRICKS, of pure Terra-cotta.
GRANITE VITRIFIED PAVING BRICKS, Buff and Grey, of pleasing appearance and enormous strength.
CANDY & CO., Lim. { No. 11, Queen Victoria-street. Works, North and South Devon.

THE COALBROOKDALE CO., Lim.
SHROPSHIRE and LONDON (Holborn Viaduct).
Stand 577, Class xxiv., &c., East Quadrant.

No. 714, CENTRAL ANNEXE.
MEAKIN & CO. Baker-street, W.
SASH PULLEYS, SASH FASTENER, AND
NEW PATENT SASH FOR CLEANING.

LIGHTNING CONDUCTORS.
SANDERSON & CO. (Richard Anderson, Proprietor).
Contractors to the War Department.
Sole Inventors of the Solid Copper Tape Lightning Conductors.
LEADENHALL HOUSE, 101, LEADENHALL-STREET, E.C.

EAST GALLERY, STAND 860.
WM. WOOLLAMS & CO.
Original Manufacturers,
ARTISTIC WALL AND CEILING PAPERS
free from Arsenic.
No. 110, HIGH-STREET, near MANCHESTER-SQUARE, W.

GLAZED BRICKS.
Stand 842, East Central Gallery.
The WORTLEY FIRECLAY CO. Elland-road, Leeds.
Only award to English makers
At International Medical and Sanitary Exhibition, 1881.